

## PATENT ABSTRACTS OF JAPAN

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IRIUCHIJIMA KUNIO

## (54) POTTERY AND COATING MATERIAL FOR POTTERY

## (57)Abstract:

PROBLEM TO BE SOLVED: To prevent a table from being injured by coating a pottery with a hardenable resin composition comprising a polyene, a polythiol and a photopolymerization initiator.

SOLUTION: A polyene is the one having two or more carbon to carbon double bonds and exemplified by triallyl isocyanurate. A polythiol is the one having two or more mercapto groups and exemplified by pentaerythritol tetrakis( $\beta$ -thiopropionate). The ratio of the polyene to the polythiol is preferably regulated so that the molar ratio of the carbon to carbon double bond of the former to the mercapto group of the latter may be (1.5:1)-(1:1.5). A photopolymerization initiator is not limited, but an acetoquinone-based one is preferable and 1- hydroxycyclohexyl phenyl ketone or the like is cited. The amount used is preferably 0.5-5.0 pts.wt. based on 100 pts.wt. total amount of the polyene and the polythiol.

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CLAIMS

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[Claim(s)]

[Claim 1] Pottery which covers the hardenability resin constituent which comes to contain a polyene, the poly thiol, and a photopolymerization initiator, and is characterized by the bird clapper.

[Claim 2] A polyene, the poly thiol, and covering material for pottery that comes to contain a photopolymerization initiator.

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## DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the pottery with which the blemish stopped sticking to a table by covering the covering material which becomes pottery from a hardenability resin constituent.

[0002]

[Description of the Prior Art] Pottery is fabricated in a predetermined form using the clay which was rich in plasticity, is the vessel for important points burned and fastened by high temperature, and means the general term of earthenware, earthenware, a stone ware, and porcelain, and, generally it is also called " and kimono." Although what is produced naturally is used as a raw material of pottery, you may fabricate and calcinate a synthetic powder and an artificial raw material. Pottery is mainly used for life supplies, such as a table, kitchen utensils, and an ornament. Moreover, it is used also for industrial use articles, such as structural articles, such as a tile, an earthenware pipe, and a sanitary ware, and also an electric supply, and special porcelain. Since the unglazing portion was exposed and the pars basilaris ossis occipitalis, especially the thread-cutter section of these pottery had become a coarse field, they had the fault that tables, such as wooden and a product made of a resin, got damaged, and a complaint came from a consumer etc. by the pars basilaris ossis occipitalis of pottery. In order to prevent damaging a table conventionally, the method of grinding by the grinding stone etc. and smoothing the pars basilaris ossis occipitalis of pottery was used.

[0003] However, with the pottery using the raw material of a coarse particle, although the technology which grinds the pars basilaris ossis occipitalis of pottery became high, even if ground, there was a fault of still damaging a table etc. Moreover, polish of the pars basilaris ossis occipitalis of pottery had the fault that productivity is low since there are many portions still undertaken to a handicraft, dust was generated and a work environment got worse further at the time of polish. Then, in order to smooth the pars basilaris ossis occipitalis of pottery, thermosetting resin is covered at the pars basilaris ossis occipitalis of the polished pottery, and the method of stiffening a hardenability resin by heating, and the method of covering the volatile solution in which the resin was dissolved with the volatile solvent, and volatilizing a volatile solvent by dryness are performed at it.

[0004]

[Problem(s) to be Solved by the Invention] However, the covered hardening film was thick, or the thickness of a hardening film became uneven, and the method using thermosetting resin or the volatile solution had the technical problem that the impression of pottery was spoiled or it was cost quantity. Moreover, when a volatile solvent was used, the technical problem that time was taken to volatilize a volatile solvent occurred preferably on environment.

[0005] this invention person acquires knowledge that viscosity is low, and it can be markedly alike compared with the conventional method, a hardening film can be finished thinly, and the impression of pottery is not spoiled but smoothness can be given to pottery by using the specific hardenability resin constituent hardened by irradiation of activity energy lines, such as ultraviolet rays and an electron ray,

as a result of inquiring wholeheartedly that such a technical problem should be solved, and he came to complete this invention

[0006]

[Means for Solving the Problem] That is, this invention is pottery which covers the hardenability resin constituent which comes to contain a polyene, the poly thiol, and a photopolymerization initiator, and is characterized by the bird clapper, and is covering material for pottery which comes to contain a polyene, the poly thiol, and a photopolymerization initiator.

[0007]

[Embodiments of the Invention] Hereafter, this invention is explained still in detail.

[0008] this invention is covering material which consists of an activity energy-line hardenability resin constituent which contains a polyene, the poly thiol, and a photopolymerization initiator, and is hardened by irradiation of activity energy lines, such as ultraviolet rays and an electron ray. When hardenability resin constituents, such as acrylic, a unsaturated-polyester system, a polyvinyl-butylal system, a Canada-balsam system, an epoxy system, and a cyanoacrylate system, are used, the setting time is late, the covered hardening film is thick, or endurance is inferior, and it is not desirable.

[0009] The polyene used by this invention means what has two or more carbon-carbon unsaturation double bonds. As a polyene, diaryl terephthalate, diaryl diphenyl phthalate, triaryl phosphate, triaryl ISOSHI nurate, trimethylol-propane diaryl ether, the trimethylol-propane triaryl ether, pentaerythritol diaryl ether, the pentaerythritol triaryl ether, the pentaerythritol tetrapod allyl-compound ether, ethylene glycol diaryl ether, propylene-glycol diaryl ether, butylene-glycol diaryl ether, diallyl malete, etc. are mentioned. What has two or more allyl groups in 1 molecule at the point that hardenability is large, in these is desirable, and triaryl ISOSHI nurate and/or diallyl malete are more desirable at the point that an effect is large.

[0010] The poly thiol used by this invention means what has two or more sulfhydryl groups. As a poly thiol, the above-mentioned polyene and the thing which reacts are desirable. Trimethylol-propane tris mercaptopropionate, Ethylene glycol dimercapto acetate, dibutyl methylene screw CHIOGURIKONETO, JIPENTAERIISURI toll hexa thiopropionate, a diethylene glycol JIMERU captan, A TORIGU recall JIMERU captan, a tetrapod glycol JIMERU captan, A thioglycol JIMERU captan, a CHIOTORI glycol JIMERU captan, A thio tetrapod GURIKORUJI mercaptan, pentaerythritol tetrakis (beta-thiopropionate), Trimethylol-propane tris (beta-thiopropionate) and tris-2-hydroxyethyl ISOSHI nurate tris - (beta-mercaptopropionate) etc. is mentioned. Pentaerythritol tetrakis (beta-thiopropionate), trimethylol-propane tris (beta-thiopropionate), and/or tris-2-hydroxyethyl ISOSHI nurate tris - (beta-mercaptopropionate) is desirable at the point in these that an effect is large.

[0011] The rate of the polyene used by this invention and the poly thiol is decided by the mole ratio of the sulfhydryl group of the carbon-carbon unsaturation double bond of a polyene, and the poly thiol, as for the ratio, 1.5:1 to 1:1.5 is desirable, 1.2:1 to 1:1.2 is more desirable, and 1:1 is the most desirable. When the rate of a polyene and the poly thiol is outside the above-mentioned range, there is a nasty smell after hardening, or the degree of hardness of a hardened material falls too much, and when remarkable, there is a possibility that it may not harden.

[0012] What is necessary is not to limit and just to use a well-known thing especially as a photopolymerization initiator used by this invention. As a photopolymerization initiator, an acetophenone system, a benzoin system, a benzophenone system, a thioxanthone system, etc. are mentioned. as an acetophenone system -- 2-hydroxy-2-methyl-1-phenyl propane-1-ON, a 4-(2-hydroxy ethoxy)-phenyl-(2-hydroxy-2-propyl) ketone, a 1-hydroxy cyclohexyl phenyl ketone, and 2-methyl -1-[4-(methylthio) phenyl]-2-morpholino propanone-1 grade is mentioned As a benzoin system, benzoin ethyl ether, benzoin iso-propyl ether, a benzyl dimethyl ketal, etc. are mentioned. As a benzophenone system, benzophenone, benzoylbenzoic-acid, benzoylbenzoic-acid methyl and 3, and 3'-dimethyl-4-methoxybenzophenone etc. is \*\*\*\*\*. As a thioxanthone system, thioxanthone, 2, and 4-diethyl thioxanthone and 2, and 4-diisopropyl thioxanthone etc. is mentioned. An acetophenone system is desirable and a 1-hydroxy cyclohexyl phenyl ketone is more desirable at the point in these that an effect is large.

[0013] The amount of the photopolymerization initiator used has the desirable 0.5 - 5.0 weight section to a total of 100 weights sections of a polyene and the poly thiol, and its 1.0 - 3.0 weight section is more desirable.

[0014] Furthermore, you may use an antioxidant, a polymerization inhibitor, a stabilizer, a plasticizer, a thixotropy grant agent, a silane coupling agent, a chelating agent, a color, a pigment, a bulking agent, a flame retarder, an antistatic agent, a surfactant, etc. in the range which does not spoil the purpose of this invention.

[0015] Earthenware and porcelain are desirable at the point in the pottery which covers the covering material of this invention that an effect is large.

[0016] The covering material of this invention does not contain a volatile solvent preferably, but is easily manufactured by mixing a polyene, the poly thiol, and a photopolymerization initiator in the container equipped with churning equipment.

[0017] The covering material of this invention can be stiffened by irradiating activity energy lines, such as ultraviolet rays and an electron ray. Ultraviolet rays are desirable at the point with easy operation in an activity energy line. As a black light, the thing equipped with a low pressure mercury lamp, the high pressure mercury vapor lamp, the ultrahigh pressure mercury lamp, the metal halide lamp, the xenon lamp, etc. is mentioned. On the occasion of hardening, a cure rate is quick, and in order to also make hard facing good, it is desirable to make it harden in the atmosphere which does not contain oxygen, such as nitrogen.

[0018] As a part which covers the covering material of this invention to pottery, the edge and partes basilaris ossis occipitalis which are called a margin, such as taps, such as a teapot, and a teacup, are desirable, it is the point which does not damage a table and the thread-cutter section is [ a pars basilaris ossis occipitalis is more desirable, and ] the most desirable also in a pars basilaris ossis occipitalis. Since a table does not get damaged and an edge is protected by covering material when it applies to the edge of pottery, and contacting taps, such as a teapot, on a table, it is effective in an edge not being missing.

[0019] Although there will be especially no limit as the covering method of the covering material of this invention if covering material can be applied, when producing in large quantities, after moving covering material to a container, the day ping method of making pottery immersed in covering material is desirable. When producing in small lots, applying by the brush etc. is desirable. When covering at the edge and pars basilaris ossis occipitalis of pottery, it is good to make covering material immersed only in an edge or a pars basilaris ossis occipitalis.

[0020]

[Example] An example explains this invention to a detail further below.

[0021] The brush coating of the covering material of example 1 polyene / poly thiol system was carried out by the day ping method, and the thread-cutter section of pottery was made to harden it by UV irradiation (irradiation intensity : 5 mmW). The ultraviolet-rays hardenability resin constituent could be uniformly applied to the thread-cutter section thinly with 0.1mm, and its setting time was also as short as 1.5 minutes. Moreover, even if it used on the table the pottery which applied this covering material, a table was not damaged and the hardened material did not spoil the appearance of pottery to eye a transparent hatchet.

Covering material of a polyene / poly thiol system: (Material of construction) The ultraviolet-rays hardenability resin constituent which contains the photopolymerization initiator 3.0 weight section to a total of 100 weights sections of a polyene, the poly thiol, and the polyene and the poly thiol. However, as a polyene, tris-2-hydroxyethyl ISOSHI nurate tris - (beta-mercaptopropionate) was used as a poly thiol, and the 1-hydroxy cyclohexyl phenyl ketone was used for diallyl maleate as a photopolymerization initiator. In addition, the mole ratio of the sulfhydryl group of the carbon-carbon unsaturation double bond of a polyene and the poly thiol was adjusted to 1:1.

Pottery: Commercial elegance, a teacup table:marketing article, the product made of a resin. [0022] It carried out like the example 1 except having used acrylic covering material instead of the example of comparison 1 polyene / poly thiol system. This covering material could not be uniformly applied to the thread-cutter section, but the thickness of a hardening film was also as thick as 0.6mm, and its

appearance of pottery was bad in order that a tuck might remain on the surface of covering material. Moreover, if the pottery which applied covering material is used on a table, it will have damaged the table.

(Material of construction)

Acrylic covering material: Commercial elegance, the ultraviolet-rays hardenability resin constituent which used the photopolymerization initiator.

[0023] Instead of the example of comparison 2 polyene / poly thiol system, it carried out like the example 1 except having used the covering material of a unsaturated-polyester system. This covering material has the setting time as long as 10 minutes, and the hardening film became hard too much and has exfoliated from pottery.

Covering material of a unsaturated-polyester system: (Material of construction) Commercial elegance, the ultraviolet-rays hardenability resin constituent which used the photopolymerization initiator.

[0024]

[Effect of the Invention] by the covering material of this invention person's hypoviscosity, compared with the conventional method, it can be markedly alike, and a hardening film can be finished uniformly thinly, and since covering material is transparent, smoothness can be given to pottery, without spoiling the impression of pottery. Moreover, since it hardens quickly, pottery can be covered in large quantities in a short time. Since smoothness can be given to especially pottery, a blemish is not attached to a table etc. Therefore, furnace origin and the ceramic industry persons concerned lose being afflicted from a consumer to a complaint, and the industrial availability is very large.

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TECHNICAL FIELD

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[The technical field to which invention belongs] this invention relates to the pottery with which the blemish stopped sticking to a table by covering the covering material which becomes pottery from a hardenability resin constituent.

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PRIOR ART

[Description of the Prior Art] Pottery is fabricated in a predetermined form using the clay which was rich in plasticity, is the vessel for important points burned and fastened by high temperature, and means the general term of earthenware, earthenware, a stone ware, and porcelain, and, generally it is also called "and kimono." Although what is produced naturally is used as a raw material of pottery, you may fabricate and calcinate a synthetic powder and an artificial raw material. Pottery is mainly used for life supplies, such as a table, kitchen utensils, and an ornament. Moreover, it is used also for industrial use articles, such as structural articles, such as a tile, an earthenware pipe, and a sanitary ware, and also an electric supply, and special porcelain. Since the unglazing portion was exposed and the bottom, especially the thread-cutter section of these pottery had become a coarse field, they had the fault that tables, such as wooden and a product made of a resin, got damaged, and a complaint came from a consumer etc. by the bottom of pottery. In order to prevent damaging a table conventionally, the method of grinding by the grinding stone etc. and smoothing the bottom of pottery was used.

[0003] However, with the pottery using the raw material of a coarse particle, although the technology which grinds the bottom of pottery became high, even if ground, there was a fault of still damaging a table etc. Moreover, polish of the bottom of pottery had the fault that productivity is low since there are many portions still undertaken to a handicraft, dust was generated and a work environment got worse further at the time of polish. Then, in order to smooth the bottom of pottery, thermosetting resin is covered at the bottom of the polished pottery, and the method of stiffening a hardenability resin by heating, and the method of covering the volatile solution in which the resin was dissolved with the volatile solvent, and volatilizing a volatile solvent by dryness are performed at it.

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EFFECT OF THE INVENTION

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[Effect of the Invention] by the covering material of this invention person's hypoviscosity, compared with the conventional method, it can be markedly alike, and a hardening film can be finished uniformly thinly, and since covering material is transparent, smoothness can be given to pottery, without spoiling the impression of pottery. Moreover, since it hardens quickly, pottery can be covered in large quantities in a short time. Since smoothness can be given to especially pottery, a blemish is not attached to a table etc. Therefore, furnace origin and the ceramic industry persons concerned lose being afflicted from a consumer to a complaint, and the industrial availability is very large.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, the covered hardening film was thick, or the thickness of a hardening film became uneven, and the method using thermosetting resin or the volatile solution had the technical problem that the impression of pottery was spoiled or it was cost quantity. Moreover, when a volatile solvent was used, the technical problem that time was taken to volatilize a volatile solvent occurred preferably on environment.

[0005] this invention person acquires knowledge that viscosity is low, and it can be markedly alike compared with the conventional method, a hardening film can be finished thinly, and the impression of pottery is not spoiled but smoothness can be given to pottery by using the specific hardenability resin constituent hardened by irradiation of activity energy lines, such as ultraviolet rays and an electron ray, as a result of inquiring wholeheartedly that such a technical problem should be solved, and he came to complete this invention

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## MEANS

[Means for Solving the Problem] That is, this invention is pottery which covers the hardenability resin constituent which comes to contain a polyene, the poly thiol, and a photopolymerization initiator, and is characterized by the bird clapper, and is covering material for pottery which comes to contain a polyene, the poly thiol, and a photopolymerization initiator.

[0007]

[Embodiments of the Invention] Hereafter, this invention is explained still in detail.

[0008] this invention is covering material which consists of an activity energy-line hardenability resin constituent which contains a polyene, the poly thiol, and a photopolymerization initiator, and is hardened by irradiation of activity energy lines, such as ultraviolet rays and an electron ray. When hardenability resin constituents, such as acrylic, a unsaturated-polyester system, a polyvinyl-butylal system, a Canada-balsam system, an epoxy system, and a cyanoacrylate system, are used, the setting time is late, the covered hardening film is thick, or endurance is inferior, and it is not desirable.

[0009] The polyene used by this invention means what has two or more carbon-carbon unsaturation double bonds. As a polyene, diaryl terephthalate, diaryl diphenyl phthalate, triaryl phosphate, triaryl ISOSHI nurate, trimethylol-propane diaryl ether, the trimethylol-propane triaryl ether, pentaerythritol diaryl ether, the pentaerythritol triaryl ether, the pentaerythritol tetrapod allyl-compound ether, ethylene glycol diaryl ether, propylene-glycol diaryl ether, butylene-glycol diaryl ether, diallyl maleate, etc. are mentioned. What has two or more allyl groups in 1 molecule at the point that hardenability is large, in these is desirable, and triaryl ISOSHI nurate and/or diallyl maleate are more desirable at the point that an effect is large.

[0010] The poly thiol used by this invention means what has two or more sulfhydryl groups. As a poly thiol, the above-mentioned polyene and the thing which reacts are desirable. Trimethylol-propane tris mercaptopropionate, Ethylene glycol dimercapto acetate, dibutyl methylene screw CHIUGURIKONETO, JIPENTAERIISURI toll hexa thiopropionate, a diethylene glycol JIMERU captan, A TORIGU recall JIMERU captan, a tetrapod glycol JIMERU captan, A thioglycol JIMERU captan, a CHIOTORI glycol JIMERU captan, A thio tetrapod GURIKORUJI mercaptan, pentaerythritol tetrakis (beta-thiopropionate), Trimethylol-propane tris (beta-thiopropionate) and tris-2-hydroxyethyl ISOSHI nurate tris - (beta-mercaptopropionate) etc. is mentioned. Pentaerythritol tetrakis (beta-thiopropionate), trimethylol-propane tris (beta-thiopropionate), and/or tris-2-hydroxyethyl ISOSHI nurate tris - (beta-mercaptopropionate) is desirable at the point in these that an effect is large.

[0011] The rate of the polyene used by this invention and the poly thiol is decided by the mole ratio of the sulfhydryl group of the carbon-carbon unsaturation double bond of a polyene, and the poly thiol, as for the ratio, 1.5:1 to 1:1.5 is desirable, 1.2:1 to 1:1.2 is more desirable, and 1:1 is the most desirable. When the rate of a polyene and the poly thiol is outside the above-mentioned range, there is a nasty smell after hardening, or the degree of hardness of a hardened material falls too much, and when remarkable, there is a possibility that it may not harden.

[0012] What is necessary is not to limit and just to use a well-known thing especially as a photopolymerization initiator used by this invention. As a photopolymerization initiator, an

acetophenone system, a benzoin system, a benzophenone system, a thioxanthone system, etc. are mentioned. as an acetophenone system -- 2-hydroxy-2-methyl-1-phenyl propane-1-ON, a 4-(2-hydroxy ethoxy)-phenyl-(2-hydroxy-2-propyl) ketone, a 1-hydroxy cyclohexyl phenyl ketone, and 2-methyl -1-[4-(methylthio) phenyl]-2-morpholino propanone-1 grade is mentioned As a benzoin system, benzoin ethyl ether, benzoin iso-propyl ether, a benzyl dimethyl ketal, etc. are mentioned. As a benzophenone system, benzophenone, benzoylbenzoic-acid, benzoylbenzoic-acid methyl and 3, and 3'-dimethyl-4-methoxybenzophenone etc. is \*\*\*\*\*. As a thioxanthone system, thioxanthone, 2, and 4-diethyl thioxanthone and 2, and 4-diisopropyl thioxanthone etc. is mentioned. An acetophenone system is desirable and a 1-hydroxy cyclohexyl phenyl ketone is more desirable at the point in these that an effect is large.

[0013] The amount of the photopolymerization initiator used has the desirable 0.5 - 5.0 weight section to a total of 100 weights sections of a polyene and the poly thiol, and its 1.0 - 3.0 weight section is more desirable.

[0014] Furthermore, you may use an antioxidant, a polymerization inhibitor, a stabilizer, a plasticizer, a thixotropy grant agent, a silane coupling agent, a chelating agent, a color, a pigment, a bulking agent, a flame retarder, an antistatic agent, a surfactant, etc. in the range which does not spoil the purpose of this invention.

[0015] Earthenware and porcelain are desirable at the point in the pottery which covers the covering material of this invention that an effect is large.

[0016] The covering material of this invention does not contain a volatile solvent preferably, but is easily manufactured by mixing a polyene, the poly thiol, and a photopolymerization initiator in the container equipped with churning equipment.

[0017] The covering material of this invention can be stiffened by irradiating activity energy lines, such as ultraviolet rays and an electron ray. Ultraviolet rays are desirable at the point with easy operation in an activity energy line. As a black light, the thing equipped with a low pressure mercury lamp, the high pressure mercury vapor lamp, the ultrahigh pressure mercury lamp, the metal halide lamp, the xenon lamp, etc. is mentioned. On the occasion of hardening, a cure rate is quick, and in order to also make hard facing good, it is desirable to make it harden in the atmosphere which does not contain oxygen, such as nitrogen.

[0018] As a part which covers the covering material of this invention to pottery, the edge and partes basilaris ossis occipitalis which are called a margin, such as a teapot, and a teacup, are desirable, it is the point which does not damage a table and the thread-cutter section is [ a pars basilaris ossis occipitalis is more desirable, and ] the most desirable also in a pars basilaris ossis occipitalis. Since a table does not get damaged and an edge is protected by covering material when it applies to the edge of pottery, and contacting taps, such as a teapot, on a table, it is effective in an edge not being missing.

[0019] Although there will be especially no limit as the covering method of the covering material of this invention if covering material can be applied, when producing in large quantities, after moving covering material to a container, the day ping method of making pottery immersed in covering material is desirable. When producing in small lots, applying by the brush etc. is desirable. When covering at the edge and pars basilaris ossis occipitalis of pottery, it is good to make covering material immersed only in an edge or a pars basilaris ossis occipitalis.

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## EXAMPLE

[Example] An example explains this invention to a detail further below.

[0021] The brush coating of the covering material of example 1 polyene / poly thiol system was carried out by the day ping method, and the thread-cutter section of pottery was made to harden it by UV irradiation (irradiation intensity : 5 mmW). The ultraviolet-rays hardenability resin constituent could be uniformly applied to the thread-cutter section thinly with 0.1mm, and its setting time was also as short as 1.5 minutes. Moreover, even if it used on the table the pottery which applied this covering material, a table was not damaged and the hardened material did not spoil the appearance of pottery to eye a transparent hatchet.

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(Material of construction)

Acrylic covering material: Commercial elegance, the ultraviolet-rays hardenability resin constituent which used the photopolymerization initiator.

[0023] Instead of the example of comparison 2 polyene / poly thiol system, it carried out like the example 1 except having used the covering material of a unsaturated-polyester system. This covering material has the setting time as long as 10 minutes, and the hardening film became hard too much and has exfoliated from pottery.

Covering material of a unsaturated-polyester system: (Material of construction) Commercial elegance, the ultraviolet-rays hardenability resin constituent which used the photopolymerization initiator.

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(54) 【発明の名称】 陶磁器及び陶磁器用被覆材

(57) 【要約】

【課題】 特に陶磁器の底部に被覆することにより、陶磁器の底部に滑らかさを付与する被覆材の提供。

【解決手段】 ポリエン、ポリチオール、及び光重合開始剤を含有する硬化性樹脂組成物からなり、特に陶磁器の底部に被覆することを特徴とする陶磁器底部用被覆材。

## 【特許請求の範囲】

【請求項1】 ポリエン、ポリチオール、及び光重合開始剤を含有してなる硬化性樹脂組成物を被覆してなることを特徴とする陶磁器。

【請求項2】 ポリエン、ポリチオール、及び光重合開始剤を含有してなる陶磁器用被覆材。

## 【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、陶磁器に硬化性樹脂組成物からなる被覆材を被覆することにより、テーブルに傷が付かなくなった陶磁器に関する。

【0002】

【従来の技術】陶磁器とは可塑性に富んだ粘土を用いて所定の形に成形し、高熱で焼き締めた要用の器物であって、土器、陶器、せつ器及び磁器の総称をいい、一般に「やきもの」とも呼ばれている。陶磁器の原料としては、天然に産するものを用いているが、又、合成原料や人工原料を成形、焼成してもよい。陶磁器は主に、食卓、台所用品、及び置物等の生活用品に用いられている。又、タイル、土管及び衛生陶器等の建築用品、更に電気用品や特殊磁器等の工業用品にも用いられている。これら陶磁器の底部、特に糸切り部は素焼きの部分が露出し、粗い面となっていたために、陶磁器の底部により、木製や樹脂製のテーブルが傷ついてしまい、消費者等から苦情が来るという欠点があった。従来、テーブルを傷つけるのを防ぐために、砥石等により研磨して陶磁器の底部を滑らかにする方法が用いられていた。

【0003】しかしながら、陶磁器の底部を研磨する技術が高くなったとはいえ、粗い粒子の原料を用いた陶磁器では、研磨しても依然テーブル等を傷つけてしまうという欠点があった。又、陶磁器の底部の研磨は、依然手作業に負う部分が多いために生産性が低く、更に研磨時に粉塵が発生して作業環境が悪化するという欠点があった。そこで陶磁器の底部を滑らかにするために、研磨した陶磁器の底部に、熱硬化性樹脂を被覆し、加熱により硬化性樹脂を硬化させる方法や、樹脂を揮発性溶剤で溶解させた揮発性溶液を被覆し、乾燥により揮発性溶剤を揮発させる方法が行われている。

【0004】

【発明が解決しようとする課題】しかしながら、熱硬化性樹脂や揮発性溶液を用いた方法は、被覆した硬化膜が厚かったり、硬化膜の厚さが不均一になったりして陶磁器の印象を損ねたり、コスト高であったりするという課題があった。又、揮発性溶剤を用いた場合、環境上好ましくなく、揮発性溶剤を揮発させるのに時間を要するという課題があった。

【0005】本発明者は、このような課題を解決すべく鋭意検討した結果、粘度が低く、かつ、紫外線及び電子線等の活性エネルギー線の照射によって硬化する特定の

べて格段に硬化膜を薄く仕上げることができ、陶磁器の印象を損なわず、陶磁器に滑らかさを付与できるとの知見を得て、本発明を完成するに至った。

【0006】

【課題を解決するための手段】即ち、本発明は、ポリエー、ポリチオール、及び光重合開始剤を含有してなる硬化性樹脂組成物を被覆してなることを特徴とする陶磁器であり、ポリエー、ポリチオール、及び光重合開始剤を含有してなる陶磁器用被覆材である。

【0007】

【発明の実施の形態】以下、本発明を更に詳細に説明する。

【0008】本発明はポリエーとポリチオール、及び光重合開始剤を含有し、紫外線及び電子線等の活性エネルギー線の照射によって硬化する活性エネルギー線硬化性樹脂組成物からなる被覆材である。アクリル系、不飽和ポリエステル系、ポリビニルブチラール系、カナダバールサム系、エポキシ系及びシアノアクリレート系等の硬化性樹脂組成物を使用した場合、硬化時間が遅かったり、被覆した硬化膜が厚かったり、耐久性が劣ったりして、好ましくない。

【0009】本発明で用いられるポリエーとは、炭素-炭素不飽和二重結合を2個以上有するものをいう。ポリエーとしては、ジアリルテレフタレート、ジアリルジフェニルフタレート、トリアリルホスフェート、トリアリルイソシヌレート、トリメチロールプロパンジアリルエーテル、トリメチロールプロパントリアリルエーテル、ペンタエリスリトールジアリルエーテル、ペンタエリスリトールトリアリルエーテル、ペンタエリスリトールテトラリルエーテル、エチレングリコールジアリルエーテル、プロピレングリコールジアリルエーテル、ブチレングリコールジアリルエーテル及びジアリルマレート等が挙げられる。これらの中では、硬化性が大きい点で、1分子中に2個以上のアリル基を有するものが好ましく、効果が大きい点で、トリアリルイソシヌレート及び/又はジアリルマレートがより好ましい。

【0010】本発明で用いられるポリチオールとは、メルカプト基を2個以上有するものをいう。ポリチオールとしては上記ポリエーと反応するものが好ましく、トリメチロールプロパントリスメルカプトプロピオネート、エチレングリコールジメルカプトアセテート、ジブチルメチレンビスチオグリコネート、ジペンタエリスリトールヘキサチオプロピオネート、ジグリコールジメルカブタン、トリグリコールジメルカブタン、テトラグリコールジメルカブタン、チオグリコールジメルカブタン、チオトリグリコールジメルカブタン、チオテトラグリコールジメルカブタン、ペンタエリスリトールテトラキス(β-チオプロピオネート)、トリメチロールプロパントリス(β-チオプロピオネート)及びトリス-2-ヒ



トプロビオネート)等が挙げられる。これらの中では、効果が大きい点で、ペンタエリスリトールテトラキス(β-チオプロビオネート)、トリメチロールプロパントリス(β-チオプロビオネート)及び/又はトリス-2-ヒドロキシエチルイソシヌレートトリス(β-メルカプトプロビオネート)が好ましい。

【0011】本発明で用いられるポリエンとポリチオール割合は、ポリエンの炭素-炭素不飽和二重結合とポリチオールのメルカプト基のモル比で決まり、その比は1.5:1~1:1.5が好ましく、1.2:1~1:1.2がより好ましく、1:1が最も好ましい。ポリエンとポリチオールの割合が上記範囲外の場合は、硬化後に異臭がしたり、硬化物の硬度が下がりすぎ、著しい場合には硬化しなかったりするおそれがある。

【0012】本発明で用いられる光重合開始剤としては、特に限定するものではなく、公知のものをいれればよい。光重合開始剤としては、アセトフェノン系、ベンゾイン系、ベンゾフェノン系及びチオキサントン系等が挙げられる。アセトフェノン系としては、2-ヒドロキシ-2-メチル-1-フェニルプロパン-1-オン、4-(2-ヒドロキシエトキシ)-フェニル-(2-ヒドロキシ-2-プロピル)ケトン、1-ヒドロキシシクロヘキシルフェニルケトン及び2-メチル-1-[4-(メチルチオ)フェニル]-2-モルフォリノプロパン-1-等が挙げられる。ベンゾイン系としては、ベンゾインエチルエーテル、ベンゾインイソプロピルエーテル及びベンジルジメチルケタール等が挙げられる。ベンゾフェノン系としては、ベンゾフェノン、ベンゾイル安息香酸、ベンゾイル安息香酸メチル及び3,3'-ジメチル-4-メトキシベンゾフェノン等が挙げられる。チオキサントン系としては、チオキサントン、2,4-ジエチルチオキサントン及び2,4-ジイソプロピルチオキサントン等が挙げられる。これらの中では、効果が大きい点で、アセトフェノン系が好ましく、1-ヒドロキシシクロヘキシルフェニルケトンがより好ましい。

【0013】光重合開始剤の使用量は、ポリエンとポリチオールの合計100重量部に対し、0.5~5.0重量部が好ましく、1.0~3.0重量部がより好ましい。

【0014】さらに、本発明の目的を損なわない範囲で、酸化防止剤、重合禁止剤、安定剤、可塑剤、チキントロビー付与剤、シランカップリング剤、キレート剤、染料、顔料、充填剤、難燃剤、帯電防止剤及び界面活性剤等を用いてもよい。

【0015】本発明の被覆材を被覆する陶磁器の中では、効果が大きい点で、陶器や磁器が好ましい。

【0016】本発明の被覆材は好ましくは揮発性溶剤を含有せず、増粘剤等を備えた溶剤中で、ポリエンとポリ

【0017】本発明の被覆材は紫外線や電子線等の活性エネルギー線を照射することにより硬化させることができる。活性エネルギー線の中では、操作が容易な点で紫外線が好ましい。紫外線照射装置としては、低圧水銀灯、高圧水銀灯、超高圧水銀灯、メタルハライドランプ及びキセノンランプ等を備えたものが挙げられる。硬化に際しては、硬化速度が速く、かつ、表面硬化も良好にするために、窒素等の酸素を含み雰囲気中で硬化させることが好ましい。

【0018】本発明の被覆材を陶磁器へ被覆する箇所としては、急須等の注ぎ口や茶碗等のふちといった端部及び底部が好ましく、テーブルを傷つけない点で、底部がより好ましく、底部の中でも糸切り部が最も好ましい。陶磁器の端部に塗布した場合には、例えば急須等の注ぎ口をテーブルに接触させたときに、テーブルが傷つかず、又、端部が被覆材により保護されるために、端部が欠けたりしないという効果がある。

【0019】本発明の被覆材の被覆方法としては、被覆材を塗布できれば特に制限はないが、大量に生産する場合には、容器に被覆材を移した後、陶磁器を被覆材に浸漬させるディッピング方法が好ましい。少量生産する場合には、ハケ等で塗布することが好ましい。陶磁器の端部や底部に被覆する場合は、被覆材を端部や底部のみに浸漬させるとよい。

【0020】

【実施例】以下実施例により本発明をさらに詳細に説明する。

【0021】実施例1

ポリエン/ポリチオール系の被覆材を陶磁器の糸切り部に、ディッピング方法によりハケ塗りし、紫外線照射(照射強度:5mW)により硬化させた。紫外線硬化性樹脂組成物は糸切り部に0.1mmと均一に薄く塗布でき、硬化時間も1.5分と短かった。又、この被覆材を塗布した陶磁器は、テーブル上で使用してもテーブルを傷つけることがなく、硬化物は透明なために陶磁器の外観を損なうことがなかった。

(使用材料)ポリエン/ポリチオール系の被覆材:ポリエン、ポリチオール、及びポリエンとポリチオールの合計100重量部に対して光重合開始剤3.0重量部を含有する紫外線硬化性樹脂組成物。但し、ポリエンとしてジアリルマレートを、ポリチオールとしてトリス-2-ヒドロキシエチルイソシヌレートトリス(β-メルカプトプロビオネート)を、光重合開始剤として1-ヒドロキシシクロヘキシルフェニルケトンを用いた。なお、ポリエンの炭素-炭素不飽和二重結合とポリチオールのメルカプト基のモル比は1:1に調整した。

陶磁器:市販品、茶碗

テーブル:市販品、樹脂製

覆材を使用したこと以外は、実施例1と同様に行った。  
この被覆材は糸切り部に均一に塗布できず、硬化膜の厚さも0.6mmと厚く、被覆材の表面にタックが残ってしまうために、陶磁器の外観が悪かった。又、被覆材を塗布した陶磁器は、テーブル上で使用するとテーブルを傷つけてしまった。

(使用材料)

アクリル系の被覆材：市販品、光重合開始剤を使用した紫外線硬化性樹脂組成物。

【0023】比較例2

ポリエチン/ポリチオール系のかわりに、不飽和ポリエステル系の被覆材を使用したこと以外は、実施例1と同様に行った。この被覆材は硬化時間が10分と長く、又、

硬化膜が硬くなりすぎて陶磁器から剥離してしまった。

(使用材料) 不飽和ポリエステル系の被覆材：市販品、光重合開始剤を使用した紫外線硬化性樹脂組成物。

【0024】

【発明の効果】本発明者の低粘度の被覆材により、従来の方法に比べて格段に硬化膜を薄く均一に仕上げることができ、被覆材が透明なので、陶磁器の印象を損なわずに、陶磁器に滑らかさを付与できる。又、速く硬化するので、短時間に大量に陶磁器を被覆することができる。特に陶磁器に滑らかさを付与できるので、テーブル等に傷が付かない。そのために消費者からの苦情に窯元や窯業関係者は悩まされることがなくなり、その産業的利用性は極めて大きい。